free survival in *ALK+* patients, similar to EGFR TKI use in patients with *EGFR* activating mutations. Molecular testing of patients for *ALK* gene fusions presents unique challenges given the low frequency of this genetic aberration. Unique characteristics of *ALK+* NSCLC patients will be discussed. Patients with *ALK+* NSCLC display distinct patterns of metastatic spread. Data from our institution suggest improved outcomes with pemetrexed in *ALK+* patients compared to other molecular cohorts. Finally, mechanisms of resistance in *ALK+* patients treated with crizotinib and strategies to overcome resistance will be addressed. The experience with *EGFR* and *ALK* oncogenes will be critical as clinical trials seeking to evaluate targeted therapies for other oncogenes in NSCLC such as MET, HER2, FGFR and BRAF proceed. Redefining lung cancer by its molecular characteristics may help us understand patterns of spread, response to targeted and non-targeted therapy and common approaches to drug resistance.

Special Session (Mon, 26 Sep, 13:15–14:15)
Circulating Tumour Cells

302 INVITED

Technological Approaches for CTC Detection

Abstract not received

303 INVITED

Circulating Tumour Cells

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Blood-borne tumour cell dissemination to distant organs can start early in cancer patients and micrometastatic spread of cancer cells is usually undetected by current imaging technologies. Therefore, sensitive methods have been developed to detect circulating tumour cells (CTC) in the peripheral blood and disseminated tumour cells (DTC) in the bone marrow at the single cell level. Interestingly, the bone marrow seems to be a common homing organ for cells derived from various epithelial tumours including breast and prostate cancer (Braun et al., NEJM 2005; Koellermann et al., JCO 2008). However, a significant fraction of DTC remain over years in a "dormant" stage, and little is known about the conditions required for the persistence of dormancy or the escape from the dormant phase into the active phase of metastasis formation Pantel et al., Nat Rev Cancer 2008 & Nat Rev Clin Oncol 2009). Sequential peripheral blood analyses, however, are more convenient for patients than BM analyses and many research groups are currently assessing the clinical utility of CTC for assessment of prognosis and monitoring of systemic therapy. In particular, monitoring of CTC during and after systemic adjuvant therapy might provide unique information for the clinical management of the individual cancer patient and allow an early change in therapy years before the appearance of overt metastases signals incurability. Ther e is an unmet need for biomarkers for real-time monitoring of the efficacy of systemic adjuvant therapy in individual patients. At present, the success or failure of anti-cancer therapies is only assessed retrospectively by the absence or presence of overt metastases during the post-operative follow-up period. However, overt metastases are, in general, incurable by most current therapies. The monitoring of CTC as "liquid biopsy" will provide new insights into the selection of tumour cells under biological therapies. CTC analyses are therefore incorporated into many current clinical trials testing new anti-cancer agents as companion diagnostics. Interestingly, cell-free nucleic acids released by CTC might become valuable biomarkers of micrometastatic disease in the future (Schwarzenbach et al., Nat Rev Cancer 2011). In conclusion, molecular characterization of DTC and CTC opens a new avenue for understanding metastatic spread of tumour cells with important implications for future therapies.

304 INVITED

Markers for Circulating Tumour Cells

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The two main potentials for CTC detection are in enumeration and characterization. In recent years, CTC enumeration prior to treatment start has been shown to provide prognostic information in several tumour types and settings. Though there are no data showing that patients should receive different treatments according to their CTC count at baseline, given the strong association of CTC numbers with outcome the implementation of CTC enumeration as a stratification factor should be considered in clinical trials for some tumour types.

Furthermore, CTC enumeration can serve as an early marker to evaluate response to anti-tumour drugs. Clinical trials are ongoing to assess whether systemic therapy in cancer patients can be tailored according to CTC counts instead of conventional radiological techniques. Meanwhile, CTC enumeration has been implemented in clinical studies to assess the anti-tumour activity of novel treatment approaches early.

In addition to CTC enumeration, characterisation of CTC holds great promise. With the advent of molecularly targeted agents, molecular characterization of tumours is increasingly determining the type of treatment for cancer patients. Characterization is nowadays mainly done on primary tumour material. But characteristics between primary tumour tissue and metastatic lesions can largely differ while tumour characteristics change over time because of genomic instability of tumours. As a result, repetitive biopsies of metastatic tumour cells are likely to be required for determining the most appropriate treatment. As taking biopsies from solid metastatic lesions is a cumbersome procedure and frequently not possible because of the location of the metastases, CTC isolation is an attractive alternative serving as a liquid biopsy. There are already several techniques in place for CTC characterization including immunohistochemistry (eg HER2, ER, EGF-R) and FISH (HER2, androgen-receptor). The first studies have been initiated to explore whether treatment with molecularly targeting drugs can be based on characteristics of CTC rather than of the primary tumour. Techniques allowing high throughput CTC characterization would be very useful to further investigate the value of CTC characterization. However, CTC isolation by the currently available CTC techniques in general yield samples containing only a few CTC while being contaminated by leucocytes. This clearly hampers CTC characterisation by sensitive techniques such as PCR since positive signals can also be from leucocytes. By using a set of genes with no or only minor expression by leucocytes, we are able to perform quantitative mRNA and miRNA expression in as little as 1 CTC spiked in healthy donor blood. Additionally, epithelial-specific PCR signals could only be found in patients with detectable CTCs and not in healthy controls. Studies are ongoing to assess whether CTC characterization for mRNA or miRNA has indeed clinical value and gives more insight into tumour biology.

The field of CTC enumeration and characterization is rapidly evolving and it is likely that CTC enumeration and characterization will get a place in the standard patient management of several tumour types shortly.

Special Session (Mon, 26 Sep, 13:15–14:15)
Management of Retroperitoneal Sarcoma

305 INVITED

Differential Diagnosis of Retroperitoneal Sarcoma

Abstract not received

306 INVITED

Surgical Management of Primary Retroperitoneal Sarcomas: Improving Outcomes

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Background: The retroperitoneum represents a complex potential space with multiple vital structures. Complete surgical resection offers the only opportunity for cure in patients with primary retroperitoneal sarcomas. The development of local recurrence after surgical resection is the main cause of disease-related mortality. The aim of this study was to analyse predictors of local recurrence and disease-specific survival within the context of current surgical treatment.

Methods: A prospectively kept sarcoma database was reviewed to identify patients who underwent surgery for primary retroperitoneal sarcoma between 1990 and 2009. Patient demographics, operative outcomes and tumour variables were correlated with local recurrence and disease-specific survival. Multivariable analysis was performed to evaluate predictors for local recurrence and disease-free survival. A literature review was performed to investigate current strategies to improve outcome of surgery for retroperitoneal sarcomas.

Results: Two-hundred patients underwent surgery at the Royal Marsden Hospital for primary RPS. The median weight of tumours was 4.0 kg and median maximum diameter 27 cm. Macroscopic clearance was achieved in 170 patients. Resection of adjacent organs was required in 126 patients. Postoperative mortality rate was 3 per cent. Seventy-five patients developed local recurrence during follow-up. The 5-year local recurrence-free survival was 55 per cent. The 5-year disease-specific survival was 69 per cent. The inability to obtain macroscopic clearance at resection and high-grade tumours were significant predictors for local recurrence and disease-specific survival. Current literature focus on the extent of surgical resection,